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*Viewpoints & Discussion:*

## **Research Skills for the Future: An Interdisciplinary Perspective**

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The springboard for this conversation is a consultant's report on the needs of private research organizations in the natural sciences in several European countries (APEC/Deloitte report discussed in Ulrich & Dash, 2013). Yet it is striking that the report reaches conclusions so often voiced by university administrators and granting councils in North America (and elsewhere) regarding university research across the natural and human sciences. In particular, it must seem that the day of interdisciplinarity has truly arrived: its praises are sung far and wide.

### **Defining Interdisciplinarity**

It is thus of great importance that we be clear on what we mean by interdisciplinarity. I have served on multiple interdisciplinary research granting adjudication committees and always been struck by the superficial claims to interdisciplinary orientation of many applicants. If the world will hail interdisciplinarity, but not define it, then we will be deluged with superficial interdisciplinarity.

There is now a fair degree of consensus among scholars who study interdisciplinarity around a few key characteristics:

- (a) Interdisciplinary focus on particular problems or questions that are too complex to be answered satisfactorily by any one discipline.
- (b) Interdisciplinary draw upon the insights of specialized research. Specialized research is performed by communities of researchers who share a set of guiding questions, concepts, theories, and methods.
- (c) Interdisciplinary evaluate the results of specialized research.
- (d) Interdisciplinary utilize multiple theories and methods. They are conscious that all theories, methods, and disciplines are useful for some purposes but these also have weaknesses.
- (e) Interdisciplinary appreciate that each discipline is characterized by an (evolving) *disciplinary perspective* or way of looking at the world. We should nevertheless be careful of stereotypes, for members of that discipline will deviate from disciplinary perspective to varying degrees.
- (f) Interdisciplinary integrate the best elements of disciplinary insights in order to generate a more comprehensive (and often more nuanced) appreciation of the issue at hand. (This may come in the form of a new understanding, new product, or new meaning.) Interdisciplinary often stress *integration* as the defining element of interdisciplinarity.

It is not enough to read one article in another discipline, or have coffee with someone from a different department. Interdisciplinarity demands a serious engagement with multiple disciplines: an understanding of terminology, perspective, theory, and method that allows one to place particular insights that might emerge from that discipline in context.

Happily, one need not be an expert in a discipline in order to interact with that discipline's ideas in a scholarly fashion. Indeed Root-Bernstein (1989) suggested that major discoveries are often made by newcomers to a discipline who appreciate the discipline's core concerns but have not absorbed its methodological and theoretical biases. Decades ago, the standard critique of interdisciplinarity was that it took many years to master any one discipline and thus interdisciplinarity scholarship was necessarily second-rate. Yet that critique may have been less dangerous to the pursuit of high-quality interdisciplinarity than today's vagueness in terminology that invites self-declarations of interdisciplinarity from scholars with no interest in seriously engaging with multiple disciplines. Interdisciplinary scholars can and should learn the perspectives of the disciplines they engage, and then the theories, methods, and concepts applied to their particular questions of interest. Interdisciplinary scholarship is not impossible, as was once widely proclaimed, but nor is it as easy as is often assumed now.

## **Teaching Interdisciplinarity**

And it can be taught. Ormerod (2013) deduces that the APEC/Deloitte report's authors expect that interdisciplinarity is something to be mastered on the job rather than in university. I confess to myself having once shared the belief that a student should first master one discipline before being exposed to interdisciplinarity. But students can learn how to be interdisciplinary early; I have recently co-authored a text aimed at first-year undergraduates on the nature of interdisciplinarity. They can be taught the meaning of interdisciplinarity, integration, and related terms. They can be taught the value of interdisciplinary research and its symbiotic relationship with specialized research. And most importantly they can be taught useful strategies for each step in the interdisciplinary research process: identifying research questions, identifying relevant disciplines, theories, and methods, searching diverse literatures, evaluating disciplinary insights, integrating insights, performing mixed method research, and communicating results (a relevant guide to the interdisciplinary research process is Repko, 2011). I discussed in this journal a few years ago (Szostak, 2007) how and why to teach this sort of material. The Association for Interdisciplinary Studies is developing an "About Interdisciplinarity" website that will provide an introduction to the literature on definitions and best practice, and also the history of interdisciplinarity. The literature on interdisciplinarity has now advanced to a level where this sort of material can be taught authoritatively and with the aid of textbooks (see Bergmann, Jahn, Knobloch, Krohn, Pohl, & Schramm, 2012; O'Rourke, Crowley, Eigenbrode, Wulfhorst, 2013; Repko, 2011, 2013).

Graduate education can be configured in many ways. Students might still specialize in a particular discipline, but be exposed to interdisciplinary techniques and encouraged to interact with students from other disciplines or take courses in other disciplines. Or students might delve in depth into two or three disciplines in the pursuit of a well-defined interdisciplinary research question. To cite just one of several examples, Lyall and coauthors at The University of Edinburgh have led graduate interdisciplinary seminars for years; their recent book (Lyall, Bruce, Tait, & Meagher, 2011) is full of advice for students, supervisors, and administrators.

Unlike what is commonly assumed, and unlike what the APEC/Deloitte study appears to suggest, teamwork is not essential to interdisciplinary practice (nor vice versa); but of course interdisciplinary teams are becoming increasingly common, especially for tackling the most complex problems. Teamwork can also be taught. The Science of Team Science group (notably Dan Stokols, but many others) has developed a set of best practices for interdisciplinary team research, and techniques for teaching these to students. The simple practice of requiring students to work in groups enhances their teamwork skills. Pairing such an activity with explicit instruction on team work strategies is even better.

I have often taught a course to undergraduates on how to perform interdisciplinary research. The various strategies are best mastered while they pursue research projects. These strategies often seem too meta-theoretical and distant from their needs until they see how these can help them in practice. These can be individual or group projects, but

students benefit enormously in either case from discussing their research with peers from different disciplinary backgrounds.

## **Further Benefits of Teaching Interdisciplinarity**

An interdisciplinary education naturally incorporates some of the other desiderata in APEC/Deloitte report's recommendations. The interdisciplinary researcher faces much greater challenges in identifying relevant literature than does the specialized researcher (I devote a great deal of my research time these days to working in the field of information science on a classification system that would better serve interdisciplinarity. We can also provide students with a "map" of the scholarly enterprise consisting of the things and relationships we study and the theories and methods and perspectives we apply). A well-taught interdisciplinarian is thus much better placed to acquire "existing knowledge." They are also armed with strategies for assessing this. Interdisciplinarity encourages a researcher's curiosity, openness to new ideas, and intellectual flexibility, and thus their general ability to "learn and adapt." Though individual interdisciplinarity is entirely feasible, the interdisciplinary researcher is encouraged to collaborate with others. And last but far from least, the interdisciplinary researcher is encouraged to undertake self-reflection. Specialized research has many advantages, but inevitably excludes alternatives from examination; interdisciplinary researchers need to interrogate themselves in order to limit their own susceptibility to bias.

Interdisciplinary research becomes more challenging as the gap between disciplines widens, but remains feasible. Ulrich and Dash (2013) are right to worry that the report under-values connections between natural science, social science, and philosophy. Natural scientists need often to engage with philosophical, economic, cultural, and political considerations. An interdisciplinary education prepares chemists to talk not just to physicists but to economists and philosophers.

Scholars of interdisciplinarity have only recently begun to grapple with ethical issues. We have stressed how to address conflicting views of how the world works much more than how to address conflicting views on how it should work. But Ulrich and Dash correctly point out that researchers often face ethical decisions, and should perhaps then receive ethical training. I personally think that we can and should teach ethics to all, and that we should do it in a particular way. I am deeply troubled by studies that show that we have been too successful in (laudably) teaching respect for diversity to our young, and the common interpretation of this as "anything goes." There are a handful of ways that people make ethical decisions (appeals to consequences, values, rules, intuition, or tradition—others might proffer a slightly different list). Importantly, these often point, albeit not conclusively, in the same direction. Honesty, personal responsibility, and a variety of other ethical principles can be strongly justified in multiple ways. Even a society that respects diversity can expect/demand a considered justification from those who behave dishonestly or irresponsibly. We can certainly expect this from our scientists in particular. Critical thinking about ethical issues should be a component of every curriculum, but an interdisciplinary approach will prepare scientists and others to grapple with a variety of ethical issues.

## Concluding Remarks

So what is the way forward? If we want high-quality interdisciplinary research—where researchers seriously engage with multiple disciplines—then we must first define carefully what we mean by interdisciplinarity. And then we can and should teach both undergraduate and graduate students how to do high-quality interdisciplinary research.

## References

- Bergmann, M., Jahn, T., Knobloch, T., Krohn, W., Pohl, C., & Schramm, E. (2012). *Methods for transdisciplinary research: A primer for practice*. Berlin, Germany: Campus.
- Lyall, C., Bruce, A., Tait, J., & Meagher, L. (2011). *Interdisciplinary research journeys: Practical strategies for capturing creativity*. London and New York: Bloomsbury Academic.
- Ormerod, R. J. (2013). Research skills for the future: A consultant's perspective. *Journal of Research Practice*, 9(1), Article V2. Retrieved from <http://jrp.icaap.org/index.php/jrp/article/view/380/305>
- O'Rourke, M., Crowley, S., Eigenbrode, S. D., Wulfhorst, J. D. (Eds.). (2013). *Enhancing communication & collaboration in interdisciplinary research*. Thousand Oaks, CA: Sage.
- Repko, A. (2011). *Interdisciplinary research: Process and theory* (2nd ed.). Thousand Oaks, CA: Sage.
- Repko, A. (with Szostak, R., & Buchberger, M.). (2013). *Introduction to interdisciplinary studies*. Thousand Oaks, CA: Sage.
- Root-Bernstein, R. (1989). *Discovery*. Cambridge, MA: Harvard University Press.
- Szostak, R. (2007). How and why to teach interdisciplinary research practice. *Journal of Research Practice*, 3(2), Article M17. Retrieved from <http://jrp.icaap.org/index.php/jrp/article/view/92/89>
- Ulrich, W., & Dash, D. P. (2013). Research skills for the future: Summary and critique of a comparative study in eight countries. *Journal of Research Practice*, 9(1), Article V1. Retrieved from <http://jrp.icaap.org/index.php/jrp/article/view/377/304>

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